

Clément MAUDUIT will defend his thesis « ***Design of a power diode on GaN/Si material and realization of associated technological milestones*** » on december 20, 2023 at 10 :00 am in IUT GEII Tours.

Abstract :

Given the limitations of silicon, gallium nitride (GaN) emerges as an ideal candidate for power electronics applications. However, challenges remain for power diodes, such as surge current capability. To overcome this issue, GREMAN, STMicroelectronics and CEA-LETI have collaborated to study a power diode with an innovative architecture known as hybrid anode diode. Finite element simulations carried out demonstrated the surge current capability of this power diode, provided that the ohmic contact on p-GaN exhibits a specific resistance below $1.10^{-4} \Omega \cdot \text{cm}^2$. Consequently, the mechanisms of ohmic contact formation were investigated, and numerous metal stack configurations were explored and characterized. Au/Ni and Ni/AZO contacts yielded excellent results, with resistances close to the targeted objective and the state of the art. A detailed investigation into the addition of an InGaN layer demonstrated that these contacts could be excellent candidates for the realization of the hybrid anode diode.